Nikolay Kardashev - a Seeker of Neighbors in Universe

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Abstract: Nikolay Kardashev is an astrophysicist by profession, a spirit scout. The initiator of Soviet and Russian efforts in SETI. Created the Kardashev scale - a useful classification of civilizations in our universe for energy consumption.

A bright, memorable person, a scientist by vocation of the highest level.

I like his classification of civilizations in our Universe according to energy consumption - the Kardashev scale:

Type1 = 10^16 W (geosocium)

Type2 = 10^26 W (heliosocium)

Type3 = 10^36 W (galactosocium)

If we allow the equivalence of energy consumption and production, then the maximum communication speed for each type of civilization:

U1 = (10^16 J/kg)^0.5 = 10^8 m/s

U2 = (10^26 J/kg)^0.5 = 10^13 m/s

U3 = (10^36 J/kg)^0.5 = 10^18 m/s

These estimates on the logarithmic scale are not so different from those obtained using the Zhirmunsky-Kuzmin critical scale factor k = e^(e^e)=3.814*10^6:

U2=U1*k and U3=U2*k.

It is curious - scientists by calling different professions, independently, come to similar dimensional assessments of the hierarchical structure of our living discrete World - this is amazing and pleasing.

On Saturday night, it's convenient to experiment with the Kardashev scale. Consider, for example, the appearance of the supernova SN 1987A on February 24, 1987, at a distance of 168 thousand light years from us. Suppose it was accompanied, along with a light pulse with a speed of U1, two more communication pulses with speeds of U2 and U3, respectively. Impulse_2 reached us in 5 of our years, impulse_3 - in 26 minutes, Therefore, the results of these control pulses entering our star system were reflected in the events of the Middle Pleistocene, at the end of the ice age, ~ 168 thousand years BC.

It seems that, following the ancient Egyptians and Alexander Chizhevsky, one can admit that the current reality given to us in sensations is formed by today's cosmological events, the electromagnetic response of which will be seen by our distant descendants. So, to paraphrase Vladimir Ulyanov (Vladimir Lenin), "... to live in the galactosocium and to be free from it, - is impossible". However, experience shows that sometimes for some reason it becomes possible to build a new World.

Nikolai Kardashev with Igor Novikov and Alexander Shatsky constructed an amazing version of the universe in the form of a multi-element multi-connected system of Worlds with Black holes as communication links. Nikolai Kardashev called them tunnels and the Internet of the Universe, and for example, a biologist would see the nervous system in them - in general, any scientist who is familiar with systems engineering would recognize in their version something capable of targeted development, reproduction and survival. A popular presentation is in the article - N. Kardashev. Information, computers and civilizations in the Universe (in rus) // Bull.spets.kastastiziz.observ., 2007, 60-61, 33-40.
https://cyberleninka.ru/article/n/informatsiya-kompyutery-i-tsivilizatsii-vo-vselennoy

In connection with its scale, it is interesting - can we perceive communication signals at speeds U2 and U3? Yes, it seems. Our perception of sound and light — phonons and photons — obeys the empirical relation: U*λ = (U^2)/v=D, where D=166 m^2/s = 166 J*s/kg. For example, for visible light, D/c=554 nm, and for audible sound at 20 C – ((343 m/s)^2)/D = 709 Hz.

The constant D has the dimension of the diffusion coefficient or specific action. The ratio says, - the speed of the communication boson in the outside world can be different, but if it hits our external sensor — the eye, the ear, or some other one — its behavior inside us obeys the peculiar principle of the least specific action.

If we allow its applicability to carriers of communication signals at speeds U2 and U3, then it turns out that they must be searched for at frequencies not lower than U2 ^2/D=6*10^23 Hz and U3 ^2/D=6*10^33 Hz . According to Fig. 2, in the cited article by Nikolay Kardashev, so far we managed to reach the frequency of ~ 10^20 Hz by technical means.

An example of the life of Nikolai Kardashev says, - the most successful strategy for creative search of the CC for us corresponds to the principle of maximum geochemical activity.

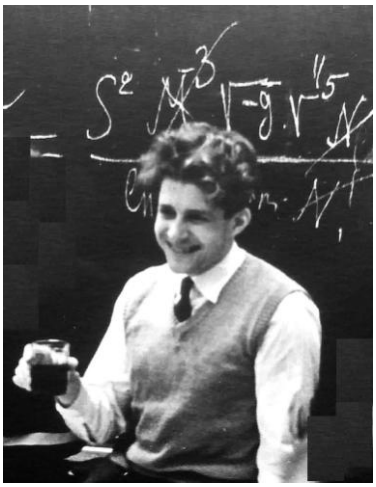
We are told –

You will know them by their deeds.

Well, find out, belatedly wave their fists -

And be sure - we are not alone such.

No, let them know us - by our deeds!



Nikolai Kardashev - toast to galactic acquaintance!